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Sharon KOH

*Singapore Management University*, sharon.koh.2010@phdps.smu.edu.sg

Christie N. SCOLLON

*Singapore Management University*, cscollon@smu.edu.sg

Derrick WIRTZ

*East Carolina University*

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# The Role of Social Relationships and Culture in the Cognitive Representation of Emotions

Sharon Koh, Christie Napa Scollon, School of Social Sciences, Singapore Management University, Singapore, Singapore<sup>1</sup>

Derrick Wirtz, Department of Psychology, East Carolina University, Greenville, NC, USA

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**Abstract:** There are individual and cultural differences in how memories of our emotions are cognitively represented. This article examines the cognitive representation of emotions in different cultures, as a result of emotional (in) consistency in different cultures. Using a continuous semantic priming task, we showed in two studies that individuals who were less emotionally consistent across relationships have stronger associations of their emotions within those relationships. Further, we found (in Study 2) that in a culture characterised by higher levels of emotional inconsistency across relationships (Singapore), stronger associations between emotions within relationships were found than in a culture characterised by emotional consistency (USA). This cultural difference in cognitive representation was fully mediated by individual differences in cross-situational consistency levels.

**Keywords:** Emotion; Culture; Priming; Self-concept; Consistency

It only happens when I dance with you, that trip to heaven till the dance is through  
 With no one else do the heavens seem quite so near.  
 Why does it happen here, only with you?  
 Two cheeks together can be so divine, but only when those cheeks are yours and mine  
 I've danced with dozens of others my whole life through  
 But the thrill that comes with spring when anything can happen  
 That only happens with you

*It Only Happens When I Dance With You* (Berlin, 1948)

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<sup>1</sup> Correspondence should be addressed to: Sharon Koh, School of Social Sciences, Singapore Management University, 90 Stamford Road, Level 4, Singapore 17980, Singapore. E-mail: sharon.koh.2010@smu.edu.sg

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Many love songs have been written about the emotions we experience in the presence of others. No doubt we develop associations between different people and different feelings. One person may be associated with joyful memories, while another may be associated with annoyance. How we come to form associations between different ideas has fascinated many throughout the history of memory research (Bower, 2000). Our beliefs and individual traits influence our memories of emotions (Barrett, 1997; Levine & Safer, 2002). Research on the subjective experience of emotions has identified universals as well as culture-specific differences, thus underscoring the importance of examining both intercultural and intracultural dimensions of emotion (Kuppens, Ceulemans, Timmermn, Diener, & Kim-Prieto, 2006).

In this paper, we report two studies that examine differences in how people cognitively represent and recall their emotions. Our results point to cultural differences in whether emotions are represented as embedded in social relations or as part of one's individual identity. We first identify a common individual difference determinant, namely emotional consistency across social contexts, which is the degree to which individuals experience similar types and levels of emotions across situations and relationships. We expect that cognitive representation of emotions vary with the extent to which an individual's emotions are influenced by the people they are with (emotional flexibility or inconsistency) or are relatively independent of social relations (emotional consistency).

### **Culture and the social nature of emotions**

Emotions are social phenomena that are shaped by the sociocultural context in which they occur (Mesquita & Leu, 2007; Scherer & Wallbott, 1994). Culture drives how emotions are understood (Mesquita & Leu, 2007). While emotions have been described as internal states or personal reactions, they can also be viewed as interpersonal exchanges that are inseparable from the larger social context (Kitayama & Markus, 1994; Markus & Kitayama, 1991; Rivera & Grinkis, 1986). Indeed, in interdependent cultures, emotions have been shown to be more grounded in interpersonal relationships, while in independent cultures emotions primarily implicate the self (Mesquita, 2001; Uchida, Townsend, Markus, & Bergsieker, 2009). East Asians have a general cognitive inclination to pay more attention to context when perceiving objects, people and events (Ji, Peng & Nisbett, 2000; Masuda & Nisbett, 2001; Nisbett, 2003). For example, an experience sampling study by Oishi, Diener, Scollon, and Biswas-Diener (2004) found that the influence of the relationship context on an individual's self-report of emotions was larger for individuals from interdependent cultures (Japanese, Indians and Hispanics) as compared to Americans. Being with friends increased positive affect across samples, but the effect was stronger for Japanese participants. Thus, for interdependent individuals, emotions differed depending on whom one was with, while emotions were relatively less affected by the social context for independent individuals.

Culture also has a deep impact on people's recollections of their emotional memories. Large cultural differences have been observed in retrospective reports of emotions that reference longer time frames (Scollon, Koh, & Au, 2011). When momentary reports of emotions were compared with retrospective reports, two separate studies found cultural differences between European Americans and Asian Americans only in their retrospective accounts, but not in their online reports (Oishi, 2002; Wirtz, Chui, Diener, & Oishi, 2009). Further, Scollon, Howard, Caldwell, and Ito (2009) showed that beliefs about ideal affect correlated less with online emotional reports and more with recalled reports that referenced longer time frames. Bringing together the evidence that emotions are more socially embedded in interdependent cultures than independent ones, and that emotional memories are influenced by culture, we predict that cultures will differ in the cognitive representation of their emotional memories.

*Hypothesis 1: Individuals in interdependent cultures are expected to have stronger associations of emotional memories within each relationship than individuals in independent cultures.*

### **Inter-relationship consistency and the centrality of relationships in emotions**

Another dimension on which individual and cultural differences have been found is the level of consistency of self-descriptions when one is with different people (Roberts & Donahue, 1994).

Individuals from East Asian cultures show greater flexibility across contexts, which is in contrast with the Western emphasis on a consistent individual identity. East Asian culture calls for an interdependent self-construal with the adjustment of one's behaviour to fit the demands of the situation (Markus & Kitayama, 1991). While Western self-validation theories emphasise the importance of an autonomous self (Swann, 1983), the East Asian dialectical self accepts contradictions and fluctuations as natural and even necessary to maintain harmony (Peng & Nisbett, 1999). The traditional Western assertion is that a person who expresses her true self is considered authentic and this contributes to positive outcomes, such as higher self-esteem, well-being and more meaning in life (Kernis & Goldman, 2006; Schlegel, Hicks, Arndt, & King, 2009). In contrast, maturity in East Asia is linked with taking the perspective of others and adjusting to their expectations (Markus, Mullally, & Kitayama, 1997). Self-consistency across situations is therefore less important. Suh (2002), for example, found that Koreans had a more flexible view of themselves across five different relationship contexts (e.g. how impulsive they were with a parent, close friend, professor, stranger or a younger person). In addition, consistency levels for Korean students were less predictive of their general levels of subjective well-being and social likability, which suggests that as compared to American culture, such consistency was less important or expected in Korean culture.

English and Chen (2007) found that the self-descriptions of Asian Americans were less consistent across contexts within a time period compared to European Americans (e.g. expressiveness with a friend versus a parent). However, Asian American demonstrated consistency over time within specific relationships. The present studies extend the argument from English and Chen (2007) to emotions as well. In order for less consistent individuals to maintain consistency within their relationships, we reasoned that it would be important for such individuals to represent their emotional memories around specific relationships rather than around the self.

Two lines of existing research support our propositions. First, culture teaches people what is important to remember about their experiences, and over time, this shapes their autobiographical memories (Fivush, 2008; Fivush & Nelson, 2004).

For example, Euro-American mothers used story-telling about emotional experiences to emphasise the autonomy and distinctiveness of their child more often than Chinese mothers who gave prominence to social interactions and relationships surrounding the child when discussing emotions with them (Wang & Fivush, 2005). Second, our proposition is also in line with the "if ... then" framework outlined by Mischel and Shoda (1995).

To those for whom the relationship context is an important "if ..., then" relationships become a central node around which emotional information is organised. People who are less consistent across relationships would represent emotional information specific to each relationship separately in their cognitive memory networks because emotions need to be retrieved within their social context.

*Hypothesis 2: Individuals who are less emotionally consistent across relationships are expected to have stronger associations of emotional memories within each relationship than individuals who are more emotionally consistent.*

### **Cognitive representation of emotions**

A cognitive analysis of emotions can yield important insights into both the causes and consequences of emotions (Ready, Robinson, & Weinberger, 2006). Studying the cognitive representation of emotions helps us to unpack people's self-reports of past experiences. For example, when asked how cheerful one felt over the past year, a person could use either an episodic or semantic strategy. With an episodic strategy, the respondent revisits each momentary experience within a time period to mentally sum moments and arrive at an overall response. Alternatively, a semantic strategy relies on generalised beliefs about the emotional self.

Robinson and Clore (2002) demonstrated that beyond very short time frames (e.g. past day), individuals tend towards a semantic strategy to fill in their memory gaps. Moreover, organised structures of semantic knowledge can inform us of an underlying belief system as semantic knowledge becomes more tightly structured and associated over time. For example, Robinson and Kirkeby (2005) showed that satisfied people have the belief that positive emotions go together. The work by Fivush also provides support for this semantic argument, as cultural norms about the nature of emotions shape semantic knowledge over time (Wang & Fivush, 2005). By examining the cognitive representation of emotions in our studies, we can test if individuals raised in different cultures have different semantic beliefs about the centrality of the social context in their interpretations and memories of emotional experiences.

*Hypothesis 3A. Individuals in interdependent and independent cultures differ in their emphasis on emotional consistency across relationships. We expect individuals in interdependent cultures to be less emotionally consistent than individuals in independent cultures.*

*Hypothesis 3B. We expect that levels of emotional consistency across relationships mediate the impact of culture on the cognitive representation of emotions.*

## **Measuring the cognitive representation of emotions**

Early research that examined the cognitive representation of emotions relied primarily on judgements of similarity in the emotion lexicon and used multi-dimensional scaling techniques to analyse the data (Romney, Moore, & Rusch, 1997; Russell, 1983; Shaver, Wu, Schwartz, 1992). This research was seminal in mapping the structure of emotions and revealed key universal features of the emotion lexicon. The present studies, however, used a reaction time paradigm to establish an index of the tightness of representation of emotions by examining the speed of participants' reactions to sequential trials that matched or mismatched the concept of interest (Robinson & Neighbors, 2006). This sequential priming paradigm allows researchers to infer the cognitive structure of the items (Robinson & Kirkeby, 2005). While research on emotion lexicon similarities reveals the structure of lay theories on similarities among emotions, a reaction time paradigm allows us to infer how individuals actually store and use their emotional memories. This cannot be quantified using a lexicon similarity task, as people would not have conscious access to this.

Robinson's computer-administered task asked participants to rate the extent to which they experienced a series of emotions as quickly and accurately as possible (Robinson & Kirkeby, 2005). Emotion words were presented one at a time in random order. In half the trials, the valence of the emotion being rated was preceded by an emotion that matched it in valence (e.g. annoyed–angry) and in the other half, it was preceded by an emotion that did not match (e.g. peaceful–miserable). If individuals' emotions were structured by valence, their responses to new emotion words that matched in valence should be faster. This would be due to the speed and reach of spreading activation of related concepts based on the semantic associations of these items (Joordens & Becker, 1997; McRae & Boisvert, 1998). Thus, faster reaction times would demonstrate that there was a stronger association between the concepts along that sorting dimension (Robinson & von Hippel, 2006). Robinson and

Kirkeby (2005) found that individuals structure their emotions by valence, as they were indeed quicker in responding to sequential questions of matched valence.

In another study by Ready et al. (2006), participants not only saw the emotion terms to be rated in each trial, but they also saw a time frame—“today” or “in general.” Each of the emotion terms was crossed with the time frames and then presented randomly. By looking at the response speed of participants across trials, Robinson and his colleagues were able to determine the strength of time frame as a structuring concept among participants of different age groups. In the present studies, we use this task to examine if individuals from different cultures structure their emotions by our dimension of interest—that of social relationships.

## **STUDY 1**

Our first study examined the key mechanism that we are proposing in our framework—that individuals who are less emotionally consistent across relationships are expected to have stronger associations of emotions within each relationship than individuals who are more emotionally consistent (Hypothesis 2). A within-culture study was conducted with a Chinese-Singaporean participant group.

## **METHOD**

### **Participants**

Participants were recruited from Singapore Management University (SMU) and were screened for proficiency in English as a first language. Eighty-eight Chinese-Singaporean students (72 female,  $M_{\text{age}} = 20.51$ ,  $SD = 1.40$ ) participated for research course credit.

### **Materials and procedure**

Participants first completed a short questionnaire in which they described their relationships with two close same-gender friends. The questionnaire guided participants to bring two specific individuals to mind and to think about their relationships with these two individuals, in order to prepare themselves for the subsequent tasks.

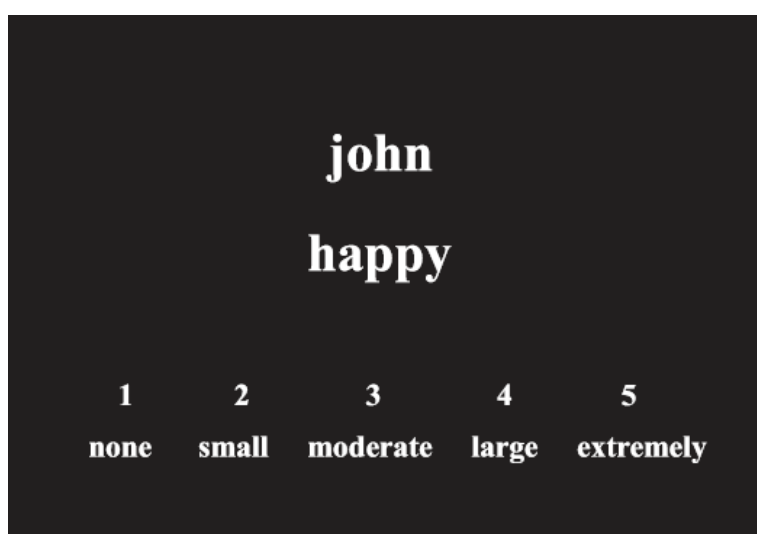
Participants were instructed that the two friends selected should not know each other and participants should spend time with each friend separately. Next, participants were asked to complete the Relationship-Emotions Task that followed the continuous semantic priming procedure used by Robinson and his colleagues (Robinson & Kirkeby, 2005). Participants were presented with 30 positively valenced emotions terms and 30 negatively valenced emotion terms<sup>2</sup>, as had been previously used for this task (Ready et al., 2006). Participants saw these 60 words presented in random order twice for a total of 120 trials.

The task was described to participants as follows: “In this task, you will be asked to rate several emotions as quickly and accurately as possible.” Participants were then introduced to the five-point rating scale (1 = none to 5 = extremely). Participants were told to rate “the amount you experience a particular emotion with either of the two people over the past year.”

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<sup>2</sup> Positively valenced emotion terms used were: Admiration, affection, bold, brave, cheerful, confident, delighted, eager, elated, energetic, enthusiastic, excited, glad, gratified, happy, inspired, interested, joyful, lively, loving, passionate, peaceful, pleasant, pleased, positive, proud, respect, strong, thrilled, worthy. Negatively valenced emotion terms used were: Afraid, agony, angry, annoyed, anxious, ashamed, bitter, blue, dejected, depressed, disappointed, distressed, down, fearful, frightened, gloomy, guilty, hostile, irritable, jittery, lonely, miserable, moody, nervous, regret, sad, scared, stressed, upset, worried.

This Relationship-Emotions Task was administered using the computer program, DirectRT and as shown in Figure 1, for each trial, a specific relationship (e.g. name of first friend—John) was displayed centred horizontally and approximately 1 inch from the vertical centre of the screen. The target emotion (e.g. happy) was displayed about half an inch below the name of the person and the response scale was displayed about 1 inch below the vertical centre of the screen. Participants indicated their responses by using the five sequential keys on the same row of the keyboard labelled with the numbers 1 through 5. To ensure accurate capture of their reaction times, participants were asked to place their fingers on the five keys throughout the experiment and to simply press down on the appropriate key as they thought of their responses. Participants completed five practice trials, within each of the two blocks, before starting on the actual study questions. The order of presentation of the friends' names was randomised between each trial, such that different participants saw different orders (e.g. friend1—friend1—friend2 or friend2—friend1—friend2). After the participants had completed rating the first block of 120 trials, they were instructed to take a 30 second break before repeating the task in a second block. Thus, each participant completed a total 240 trials.



*Figure 1. Sample screen from relationships-emotions task.*

## **Results**

### ***Data transformations and priming scores***

Reaction times for the task were recorded in milliseconds. As reaction time data is highly skewed, the data were then log-transformed. Consistent with Robinson and Kirkeby's (2005) analysis, outliers were identified as being plus or minus 2.5 standard deviations from the mean. Outliers constituted 1.8% of all the reaction time data in Study 1 and were excluded from further analyses. Based on the design of the Relationship-Emotions Task, there were four possible relationship pair combinations which each occurred approximately 25% of the time: friend 1 prime preceding friend 1 target (F1F1), friend 1 prime preceding friend 2 target (F1F2), friend 2 prime preceding friend 1 target (F2F1) and friend 2 prime preceding friend 2 target (F2F2).

Priming scores were calculated to provide an indication of the strength of association of emotions within each relationship. To determine the extent to which participants were faster in answering a target question about friend 1 when a friend 1 prime question, as opposed to a friend 2 question, preceded it, a friend 1 priming score was calculated as the difference in reaction times between F2F1 and F1F1 trials. A higher friend 1 priming score indicated stronger associations of emotions within friendship 1. In other words, recalling how one felt with a particular person made it easier to recall further emotional memories with that same person. In the same way, we calculated the friend 2

priming score as the difference in reaction times between F1F2 and F2F2 trials. We then averaged the friend 1 and friend 2 priming scores to create an overall friendship priming score that indicated the strength of association of an individual's emotions by friendships in general.

Emotional consistency and representation of emotions across relationships. To examine emotional consistency, we calculated an index of consistency across relationships as the within-subject correlation between each participant's actual emotion ratings in the context of each of their two relationships. Higher correlation scores showed greater consistency in participants' actual emotional experiences between different relationship contexts. For example, if participant A rated his happiness as a 5 when he was with his first friend and also with the second, this would show higher emotional consistency. On the other hand, participant B who rated her happiness as a 5 with her first friend, but as a 1 with her second friend is low on emotional consistency. Correlation scores were then Fisher *r*-to-*Z* transformed before tests of significance were conducted.

We predicted that individuals who were less emotionally consistent across relationships would have stronger associations of emotions within each relationship. In other words, we expected to find an inverse correlation between actual emotional consistency levels and the strength of associations or priming of emotions within relationships. In support of this prediction, we found a significant inverse correlation between emotional consistency scores and both the friend 1 ( $r(88) = -.31, p = .004$ ) and friend 2 ( $r(88) = -.32, p = .003$ ) priming scores. This was found with the overall friendship priming score as well ( $r(88) = -.39, p < .001$ ). Thus, individuals who were less emotionally consistent across relationships had higher within-relationship priming scores, which indicated that less emotionally consistent individuals had stronger associations of emotions within each friendship.

## STUDY 2

In our first study, we examined a single-culture sample and found support for Hypothesis 2. Individuals who were less consistent with their emotions between friendships were more likely to cognitively represent their emotions within each friendship separately. In Study 2, we expanded our analysis to examine cross-cultural differences in general levels of priming of emotions by relationships. While friendships had been the focus of Study 1, we sought to replicate our findings using other relationships. Participants were free to select any two friendships in Study 1, but in Study 2, we opted to tighten the criteria for selection of relationships and predefined that participants would have to select one close friend and one of their parents to think about as they completed the task. In addition, while participants were instructed that the two friends selected in Study 1 should not know each other, it was still possible for some participants to have selected friends that they might have spent time with together. This possible overlap was better addressed in Study 2 by having participants select a parent and a friend instead.

## METHOD

### Participants

Participants were recruited from two college student samples and were undergraduates attending either the SMU in Singapore or East Carolina University (ECU) in the USA. Only participants born in America were included in the ECU sample and participants from SMU were screened for proficiency in English as a first language and being born in Asia. Following these screening criteria, we had 60 male and 69 female participants from SMU and 49 male and 92 female participants from ECU. Participants from SMU ( $M = 21.43, SD = 1.67$ ) were slightly older than those from ECU ( $M = 18.79, SD = 1.41$ ),  $t(268) = 14.10, p < .001, d = 1.72$ .

### Materials and procedure



Participants completed the same Relationship-Emotions task as described in Study 1, but instead of two close friends, participants in Study 2 were instructed to choose a parent and a close friend.

For the parent relationship, participants were asked to specify the name they use when they think of the parent (e.g. dad). Participants rated a total of 240 trials with half the trials showing the parent relationship as the target to be rated and the other half showing the friendship instead.

Again, the order of presentation of the two relationships was randomised between each trial, such that different participants saw different orders (e.g. parent–parent–friend or friend–parent–friend).

## Results

### *Data transformations and priming scores*

As with Study 1, outliers were identified as being plus or minus 2.5 standard deviations from the mean and were excluded from further analyses. Outliers constituted 2.0% of the data collected. For this study, a repeated measures ANOVA was conducted to examine the differences in reaction times for the different relationship pair combinations between the cultural groups. However, for ease of interpretation, priming scores were also calculated to provide an indication of the strength of associations in the cognitive representation of emotions. The friend priming score was calculated as the difference in reaction time between parent–friend (PF) and friend–friend (FF) trials, as this indicated the extent to which participants were faster in answering a question about a friend when it was preceded by a friend question, as opposed to a parent question. A higher friend priming score indicated a stronger association of emotions within the friendship. In the same way, we calculated the parent priming score as the difference in reaction times between FP and PP trials. As in Study 1, we also calculated the relationship priming score as the average of the friendship and parent priming scores.

Finally, we also calculated valence priming scores. The positive and negative priming scores were calculated as the difference in reaction times between negative–positive (np) and positive–positive (pp) trials, and the difference in reaction times between pn and nn trials, respectively. No cultural differences in valence priming were predicted and we indeed found no between-group differences. No differences were found in the positive priming scores for Singaporean students ( $M = 1.11$ ,  $SD = .11$ ) and American students ( $M = 1.11$ ,  $SD = .11$ ),  $t(268) = .12$ ,  $p = .91$ ,  $d = .01$ .

And, no differences were found between Singaporean students ( $M = 1.03$ ,  $SD = .10$ ) and American students ( $M = 1.02$ ,  $SD = .10$ ),  $t(268) = 1.32$ ,  $p = .19$ ,  $d = .16$ , for their negative priming scores as well. Therefore, valence was not included in the further analyses.

### *Replication of consistency and representation findings*

As in Study 1, an index of consistency across relationships was calculated as the within-subject correlation between each participant's actual emotion ratings in their two relationships (parent and close friend) and correlation scores were then Fisher  $r$ -to- $Z$  transformed. To test our hypothesis, we examined the correlation between the emotion consistency scores and parent and friend priming scores across all participants (i.e. across cultures). Significant inverse correlations were found for both the friend ( $r(270) = -.13$ ,  $p = .031$ ) and parent ( $r(270) = -.26$ ,  $p < .001$ ) priming scores. And this was also found with the overall relationship priming score as well ( $r(270) = -.27$ ,  $p < .001$ ). Thus, we found support for Hypothesis 2, and replicated our finding that individuals who were less emotionally consistent across relationships had higher within-relationship priming scores, which again indicated that less emotionally consistent individuals had stronger associations of emotions within each relationship.

### *Culture and representation of emotions*

A 2 (Culture)  $\times$  2 (Prime Relationship)  $\times$  2 (Target Relationship) mixed ANOVA on the log reaction times was conducted, with the relationship subject (i.e. parent or friend) of the prime and of the target serving as within-subject variables. We found a significant Prime Relationship by Target Relationship interaction,  $F(1, 268) = 533.61, p < .001, \eta_p^2 = .67$ . Participants were significantly faster in responding when the target question matched ( $M = 1.41, SD = .36$ ) the prime question in terms of the relationship it was referencing than when there was a mismatch ( $M = 1.55, SD = .41$ ),  $t(269) = 20.41, p < .001, d = 2.49$ . This interaction indicates that individuals do organise their emotions based on the dimension of relationships.

In addition, as predicted, the Prime Relationship by Target Relationship by Culture three-way interaction was also significant,  $F(1, 268) = 5.29, p = .02, \eta_p^2 = .019$ , which indicated that American and Singaporean students showed different levels of relationship priming effects. In support of Hypothesis 1, Singaporean students had significantly higher friend priming scores ( $M = 1.12, SD = .10$ ) than American students ( $M = 1.10, SD = .10$ ),  $t(268) = 2.08, p = .04, d = .25$ . Singaporean students also had slightly higher parent priming scores ( $M = 1.11, SD = .12$ ) than American students ( $M = 1.09, SD = .09$ ); however, this difference did not reach statistical significance,  $t(268) = 1.44, p = .16, d = .18$ .

### ***Culture and emotional consistency across relationships***

As predicted, Singaporeans ( $M = .43, SD = .42$ ) had lower emotional consistency scores between relationships than Americans ( $M = .56, SD = .32$ ),  $t(268) = 2.67, p = .008, d = .33$ . This finding supported Hypothesis 3A and provided a good replication of English and Chen's (2007) findings about consistency across relationships, using a different measurement method.

### ***Cultural representation of emotion mediated by consistency between relationships***

In support of Hypothesis 3B, we found that the level of emotional consistency between relationships mediated the relationship between culture and cognitive representation of emotions. Following Baron and Kenny (1986), we first examined the relationship between culture and consistency between relationships using a regression model and found that culture was a significant predictor of consistency ( $\beta = .161, SE = .064, p = .008$ ). Culture was also a significant predictor of representation of emotions (i.e. relationship priming score) ( $\beta = .139, SE = .004, p = .022$ ). Next, we added our measure of consistency between relationships into the culture and representation regression model and found that consistency was a significant predictor of representation ( $\beta = -.025, SE = .003, p < .000$ ), while culture was no longer significant ( $\beta = .099, SE = .003, p = .10$ ). Consistency between relationships fully mediated the effects of culture on representation of emotions (Figure 2). A Sobel test provided further support for this full mediation ( $Z = 2.31, p = .020$ ). In addition, we conducted the mediation analysis again using Preacher and Hayes' bootstrapping method (Preacher & Hayes, 2004), which also revealed a significant mediation (bootstrapping path =  $-.0023$ , 95% confidence interval (CI) =  $[-.0046, -.0005]$ ).

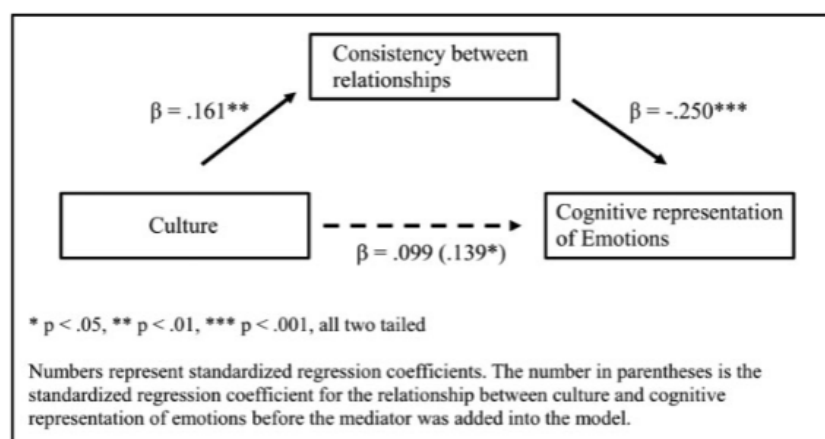


Figure 2. Mediation analysis for culture, consistency between relationships and cognitive representation of emotion

## GENERAL DISCUSSION

We examined the role of social relationships in the cognitive representation of emotions across cultures. In two studies, we showed that lower cross-situational consistency in emotions was associated with stronger cognitive representational associations of emotions within relationships. In Study 2, we showed that in a culture where emotional consistency between relationships is more prevalent (USA), emotions within relationships were more weakly associated, compared to a culture where emotional flexibility (or inconsistency) is emphasised (Singapore). We also found that this difference in the cognitive representation of emotions was fully mediated by cultural differences in cross-situational consistency levels.

### *Implications*

Our results bolster existing research that has shown that interdependent cultures tend to conceptualise emotions within the context of inter-personal relationships (Mesquita, 2001). Our studies are the first, to our knowledge, to examine the impact of cross-cultural differences in cognitive representations of emotions on individual recollections of emotions as part of one's relations or as part of one self. While previous studies have examined cultural differences in attention and eye gaze patterns (e.g. Masuda et al., 2008, Nisbett, 2003), ours is the first to examine cultural differences in the cognitive association networks of emotions in the context of individual difference in how emotions are stored. Furthermore, using response latencies instead of self-report data, we obviate concerns about response styles and demand characteristics.

Our results also extend existing research that demonstrates the robust stability of individual traits within relationships even as these traits varied across contexts. While English and Chen (2007) compared differences in the consistency of personality descriptors across relationships using a self-report method, our study was instead focused on emotional experiences across relationships using a computerised task. Extending English and Chen's research to emotions and using our response latency paradigm, we were able to conduct a direct test of their cross-cultural theory at the level of cognitive representational structures of emotions. While the focus of our research was on emotions, we think it would be worthwhile to examine if the same relationship between consistency and representation of semantic knowledge would also hold for other kinds of memories.

Finally, the question of when such cross-cultural differences emerge developmentally is also unexplored to date. In both our sets of studies, we observe differences in between and within person stability cross-culturally among college students. Whether these cultural differences would emerge

among a sample of children remains an empirical question that may shed light on the development of cultural differences in the memory of emotions.

### *Limitations and further questions*

This study was a first step in examining the impact on emotions of cross-cultural differences in the nature of emotions as contextual or belonging to the self at a cognitive level. In future research, it would be important to extend the paradigm we have examined and look at different relationships beyond that of close friends and parents. In Study 2, although the expected pattern of results was found for parent priming scores, in that Singaporeans had higher scores than Americans, this difference was not statistically significant. The question of the generalisability of our findings across different relationships remains to be examined in future studies. It is our expectation that our findings should replicate across different close relationships.

These studies were also only conducted in a Singaporean and American school setting and it will be important to see how it could be replicated with other samples. In fact, some research suggests there could be important differences even among East Asian cultures in terms the amount and meaning of consistency across different contexts (Kashima et al., 2004). Further, future studies might want to include a specific measure of independence and interdependence to examine differences between samples and individuals on this factor. Our studies also only relied on a single research method design—that of a continuous semantic priming task. The task we used relied on participants being able to follow the instruction to provide ratings of their emotions with different people “as quickly and accurately as possible,” But it is possible that some might have found it difficult or unnatural to do this over the task’s successive trials. In addition, while we had instructed participants to select two friends who did not know each other in Study 1, it is possible that some might not have followed our instructions. Future studies should examine the use of other measures of cognitive representational structure to address some of these methodological concerns.

Finally, building structurally on Suh’s (2002) findings that self-concept consistency was found to be less predictive in Korean culture of subjective well-being and social likeability, the question of the functionality of structuring one’s emotions in culture-specific ways also remains. It is worth examining if in order for interdependent individuals to be socially successful, it would be functionally important for them to have strong associations of their emotions within relationships.

Self-report measures of relationship success or positive relationship outcomes could be used to provide a good first indicator of the social outcomes related to different representation schemes in different cultures, and beyond that, third party ratings of participants’ social success would also be important to examine. For example in the studies by Suh (2002), ratings from two informants (a family member and a friend) on how well the participant dealt with social situations and how likable the participant was in general were collected.

In sum, we found that there were important cultural differences in the way emotions are cognitively represented. Specifically, we found stronger associations of emotions within close friendships in Singapore compared to America.

Furthermore, our studies demonstrated a link between individuals’ emotional consistency levels and their cognitive representation of emotions across cultures. A significant inverse correlation was found between levels of emotional consistency across different relationships and tightness of representation of emotions around those relationships. People who were less emotionally consistent across relationships had stronger associations of their emotions within each relationship. In fact, emotional consistency across relationships was found to fully mediate the observed cultural differences in emotion representations.

## REFERENCES

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182. doi:10.1037/0022-3514.51.6.1173
- Barrett, L. F. (1997). The relationship among momentary emotional experiences, personality descriptions, and retrospective ratings of emotion. *Personality and Social Psychology Bulletin*, 23, 1100–1110. doi:10.1177/01461672972310010
- Berlin, I. (1948). *It only happens when I dance with you* [Recorded by Fred Astaire]. On Easter parade: Original motion picture soundtrack [CD]. United States: Rhino/Warner Brothers.
- Bower, G. H. (2000). A brief history of memory research. In E. Tulving, & F. O. M. Craik (Eds.), *The Oxford handbook of memory* (pp. 3–32). New York: Oxford University Press.
- English, T., & Chen, S. (2007). Culture and self-concept stability: Consistency across and within contexts among Asian Americans and European Americans. *Journal of Personality and Social Psychology*, 93, 478–490. doi:10.1037/0022-3514.93.3.478
- Fivush, R. (2008). Remembering and reminiscing: How individual lives are constructed in family narratives. *Memory Studies*, 1, 49–58. doi:10.1177/1750698007083888
- Fivush, R., & Nelson, K. (2004). Culture and language in the emergence of autobiographical memory. *Psychological Science*, 15, 573–577. doi:10.1111/j.0956-7976.2004.00722.x
- Ji, L., Peng, K., & Nisbett, R. E. (2000). Culture, control, and perception of relationships in the environment. *Journal of Personality and Social Psychology*, 78, 943–955. doi:10.1037/0022-3514.78.5.943
- Joordens, S., & Becker, S. (1997). The long and short of semantic priming effects in lexical decision. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 23, 1083–1105. doi:10.1037/0278-7393.23.5.1083
- Kashima, Y., Kashima, E., Farsides, T., Kim, U., Strack, F., Werth, L., & Yuki, M. (2004). Culture and context-sensitive self: The amount and meaning of context-sensitivity of phenomenal self differ across cultures. *Self and Identity*, 3, 125–141. doi:10.1080/13576500342000095
- Kernis, M. H., & Goldman, B. M. (2006). A multi-component conceptualization of authenticity: Theory and research. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 283–357). New York: Academic Press.
- Kitayama, S., & Markus, H. R. (Eds.). (1994). *Emotion and culture: Empirical studies of mutual influence*. Washington, DC: American Psychological Association.
- Kuppens, P., Ceulemans, E., Timmerman, M. E., Diener, E., & Kim-Prieto, C. (2006). Universal intracultural and intercultural dimensions of the recalled frequency of emotional experience. *Journal of Cross-Cultural Psychology*, 37, 491–515. doi:10.1177/0022022106290474
- Levine, L. J., & Safer, M. A. (2002). Sources of bias in memory for emotions. *Current Directions in Psychological Science*, 11, 169–173. doi:10.1111/1467-8721.00193
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224–253. doi:10.1037/0033-295X.98.2.224
- Markus, H.R., Mullally, P., & Kitayama, S. (1997). Selfways: Diversity in modes of cultural participation. In U. Neisser, & D. Jopling (Eds.), *The conceptual self in context: Culture, experience, self-understanding* (pp. 13–61). Cambridge: Cambridge University Press.
- Masuda, T., Ellsworth, P., Mesquita, B., Leu, J., Tanida, S., & Veerdonk, E. (2008). Placing the face in context: Cultural differences in the perception of facial emotion. *Journal of Personality and Social Psychology*, 94, 365–381. doi:10.1037/0022-3514.94.3.365

- Masuda, T., & Nisbett, R. E. (2001). Attending holistically versus analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology*, 81, 922–934. doi:10.1037/0022-3514.81.5.922
- McRae, K., & Boisvert, S. (1998). Automatic semantic similarity priming. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 24, 558–572. doi:10.1037/0278-7393.24.3.558
- Mesquita, B. (2001). Emotions in collectivist and individualist contexts. *Journal of Personality and Social Psychology*, 80, 68–74. doi:10.1037/0022-3514.80.1.68
- Mesquita, B., & Leu, J. (2007). The cultural psychology of emotion. In S. Kitayama, & D. Cohen (Eds.), *Handbook of cultural psychology* (pp. 734–759). New York, NY: Guilford Press.
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102, 246–268. doi:10.1037/0033-295X.102.2.246
- Nisbett, R. E. (2003). *The geography of thought: How Asians and Westerners think differently...and why*. New York: Free Press.
- Oishi, S. (2002). Experiencing and remembering of well-being: A cross-cultural analysis. *Personality and Social Psychology Bulletin*, 28, 1398–1406. doi:10.1177/014616702236871
- Oishi, S., Diener, E., Napa Scollon, C., & Biswas-Diener, R. (2004). Cross-situational consistency of affective experiences across cultures. *Journal of Personality and Social Psychology*, 86, 460–472. doi:10.1037/0022-3514.86.3.460
- Peng, K., & Nisbett, R. E. (1999). Culture, dialects, and reasoning about contradiction. *American Psychologist*, 54, 741–754. doi:10.1037/0003-066X.54.9.741
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36, 717–731. doi:10.3758/BF03206553
- Ready, R. E., Robinson, M. D., & Weinberger, M. (2006). Age differences in the organization of emotion knowledge: Effects involving valence and time frame. *Psychology and Aging*, 21, 726–736. doi:10.1037/0882-7974.21.4.726
- Rivera, J., & Grinkis, C. (1986). Emotions as social relationships. *Motivation and Emotion*, 10, 351–369. doi:10.1007/BF00992109
- Roberts, B. W., & Donahue, E. M. (1994). One personality, multiple selves: Integrating personality and social roles. *Journal of Personality*, 62, 199–218. doi:10.1111/j.1467-6494.1994.tb00291.x
- Robinson, M. D., & Clore, G. L. (2002). Episodic and semantic knowledge in emotional self-report: Evidence for two judgment processes. *Journal of Personality and Social Psychology*, 27, 1520–1532.
- Robinson, M. D., & Kirkeby, B. S. (2005). Happiness as a belief system: Individual differences and priming in emotion judgments. *Personality and Social Psychology Bulletin*, 31, 1134–1144. doi:10.1177/0146167204274081
- Robinson, M. D., & Neighbors, C. (2006). Catching the mind in action: Implicit methods in personality research and assessment. In M. Eid, & E. Diener (Eds.), *Handbook of multimethod measurement in Psychology* (pp. 115–125). Washington, DC: American Psychological Association.
- Robinson, M. D., & von Hippel, W. (2006). Rose-colored priming effects: Life satisfaction and affective priming. *Journal of Positive Psychology*, 1, 187–197. doi:10.1080/17439760600885705

- Romney, A. K., Moore, C. C., & Rusch, C. D. (1997). Cultural universals: Measuring the semantic structure of emotion terms in English and Japanese. *Proceedings of the National Academy of Sciences*, 94, 5489–5494. doi:10.1073/pnas.94.10.5489
- Russell, J. A. (1983). Pan cultural aspects of the human conceptual organization of emotions. *Journal of Personality and Social Psychology*, 45, 1281–1288. doi:10.1037/0022-3514.45.6.1281
- Scherer, K. R., & Wallbott, H. G. (1994). Evidence for universality and cultural variation of differential emotion response patterning. *Journal of Personality and Social Psychology*, 66, 310–328. doi:10.1037/0022-3514.66.2.310
- Schlegel, R. J., Hicks, J. A., Arndt, J., & King, L. A. (2009). Thine own self: True self-concept accessibility and meaning in life. *Journal of Personality and Social Psychology*, 96, 473–490. doi:10.1037/a0014060
- Scollon, C. N., Howard, A. H., Caldwell, A. E., & Ito, S. (2009). The role of ideal affect in the experience and memory of emotions. *Journal of Happiness Studies*, 10, 257–269. doi:10.1007/s10902-007-9079-9
- Scollon, C. N., Koh, S., & Au, E. (2011). Cultural differences in the subjective experience of emotion: When and why they occur. *Personality and Social Psychology Compass*, 5, 853–864. doi:10.1111/j.1751-9004.2011.00391.
- Shaver, P. R., Wu, S., & Schwartz, J. C. (1992). Cross-cultural similarities and differences in emotion and its representation: A prototype approach. In M. S. Clark (Ed.), *Review of Personality and Social Psychology* (Vol. 13, pp. 175–212). Newbury Park, CA: Sage.
- Suh, E. M. (2002). Culture, identity consistency, and subjective well-being. *Journal of Personality and Social Psychology*, 83, 1378–1391. doi:10.1037/0022-3514.83.6.1378
- Swann, W. B. (1983). Self-verification: Bringing social reality into harmony with the self. In J. Suls & A. G. Greenwald (Eds.), *Psychological perspectives on the self* (Vol. 2, pp. 33–66). Hillsdale, NJ: Erlbaum.
- Uchida, Y., Townsend, S. S. M., Markus, H. R., & Bergsieker, H. B. (2009). Emotions as within or between people? Lay theory of emotion expression and emotion inference across cultures. *Personality and Social Psychology Bulletin*, 35, 1427–1439. doi:10.1177/0146167209347322
- Wang, Q., & Fivush, R. (2005). Mother–child conversations of emotionally salient events: Exploring the functions of emotional reminiscing in European-American and Chinese families. *Social Development*, 14, 473–495. doi:10.1111/j.1467-9507.2005.00312.x
- Wirtz, D., Chiu, C., Diener, E., & Oishi, S. (2009). What constitutes a good life? Cultural differences in the role of positive and negative affect in subjective well-being. *Journal of Personality*, 77, 1167–1196. doi:10.1111/j.1467-6494.2009.00578.